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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,213	03/28/2005	Dietmar Birgel	BIRG3004FJD	5089
23364 7590 04/03/2009 BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314-1176			EXAMINER ABOAGYE, MICHAEL	
			ART UNIT 1793	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/507,213	Applicant(s) BIRGEL, DIETMAR	
	Examiner MICHAEL ABOAGYE	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 33-37, 41-44, 49, 54-59, 65 and 66 is/are pending in the application.
- 4a) Of the above claim(s) 54-59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 33-37, 41-44, 49, 65 and 66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because **figures 1-5 should be designated/labeled Prior Art. (Note figures 1-5 have specifically been illustrated in Applicant's specification pages 8-12 being drawn to conventional circuit board.** Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted, after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 33-37, 41-44, 49, 65 and 66 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 65 and 66, recite "in the case of" and "as the case may be" Use of the phrase "in the case of" and "as the case may be" imply an optional limitation therefore it is unclear as to whether or not Applicant is positively claiming that (i) the circuit board is arranged horizontally; (ii) Plural ort single THT-components are located underneath the circuit board.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 33, 35 and 65 are rejected under 35 U.S.C. 102(b) as being anticipated by Shibo et al. (US Patent No. 6123247).

Regarding claim 65, Shibo et al. teaches a method for populating and soldering a circuit board (32, figure 6) having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional (see, the

Art Unit: 1793

component 57, figure 6), automatic soldering technology, comprising the steps of: populating the THT-component on the first side of the circuit board, with the connection wire or pin stuck from the first side through a hole and emerging on the second side of the circuit board in the area of a soldering contact surface printed with a solder paste(see all the wire components which are non heat resistant are placed on the first or the upper side of the PCB, see figure 6 and column 3, line 62-column 4, line 40); placing the circuit board so populated into a reflow oven for the soldering (see, abstract, column 1, lines 35-46, and column 3, lines 62-67), wherein the first side populated with the THT-component is at least partially, essentially shielded from a heat or energy feed effecting the soldering the first side of the circuit board populated with the one or more THT-components is shielded, thermally separated, in the reflow oven essentially by the circuit board itself from the heat or energy feed acting on the second side for the soldering (Note the hot air or the heat feed 101 as in figure 6, acts on the second side of the PCB 32 on which the heat resistance component 37 is placed). Shibo et al. also teaches a circuit board arranged horizontally during travel through the reflow oven by a conveyor (81, figures 1A and 5, and column 2, lines 43-60) for the soldering; wherein THT-components are located on a side of the circuit board opposite that of the heat resistant components (Note, the limitation calling for THT-component to be located underneath the circuit board is noted, however one of ordinary skill in the art reading the claims in light of the applicant's disclosure, would appreciate that said limitation "underneath" can be interpreted to mean, that side of the circuit board opposite the direction of the heat feed) . Shibo et al. teaches THT component(s) of low heat resistant

Art Unit: 1793

located at a side of the circuit board opposite the direction of the heat feed or the hot side (101) thereby enabling said components to be thermally shielded or separated from the direct heat by the circuit board itself (also see, column 4, lines 33-40 and figure 6). (It should be pointed out that though in figure 6, cool air (102) is used for cooling and regulating the temperature on the side of the non-heat resistant components, regardless said components are thermally separated by the circuit board itself and therefore the circuit board of Shibo et al. inherently meet the shielding limitation (see, column 3, line 62-column 4, line 50).

Regarding claim 33, Shibo et al. teaches comprising the step of: applying solder paste to solder contact (see, column 4, lines 33-40 and column 5, lines 11-25) surfaces provided on the second side of the circuit board for a populating of the second side of the circuit board with at least one SMD-component, wherein: following populating of the second side of the circuit board with the SMD-component, it is soldered, together with the connection wire of the THT-component, in the reflow oven (Note Shibo et al. teaches a one step process by which both the heat resistance and the non-heat resistant components are solder in one pass reflow, column 5, line 53 – column 6, line 10 and column 7, lines 34-61).

Regarding claim 35, Shibo et al. teaches having at least one SMD-component populated at the first side of the circuit board (see, the heat resistant surface mount component (SMD) 37, figure 6).

Art Unit: 1793

Regarding claim 35, Shibo et al. teaches cooling the first side of the circuit board populated with the one or more THT-components in the reflow oven (see, figure 6, and column 3, line 62-column 4, line 50).

Claim Rejections - 35 USC § 102/103

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 34, 36 and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative under or 35 U.S.C. 103(a) as being obvious over Shibo et al. (US Patent No. 6123247)

Regarding claim 66, Shibo et al. teaches a method for populating and soldering a circuit board (32, figure 6) having a first side and a second side and at least one wired, electrical component ("THT-component") having at least one connection wire or connection pin and a housing or casing thermally critical for conventional (see, the component 57, figure 6), automatic soldering technology, comprising the steps of: populating the THT-component on the first side of the circuit board, with the connection

Art Unit: 1793

wire or pin stuck from the first side through a hole and emerging on the second side of the circuit board in the area of a soldering contact surface printed with a solder paste (see all the wire components which are non heat resistant are placed on the first or the upper side of the PCB, see figure 6 and column 3, line 62-column 4, line 40); placing the circuit board so populated into a reflow oven for the soldering (see, abstract, column 1, lines 35-46, and column 3, lines 62-67), wherein the first side populated with the THT-component is at least partially, essentially shielded from a heat or energy feed effecting the soldering the first side of the circuit board populated with the one or more THT-components is shielded, thermally separated, in the reflow oven essentially by the circuit board itself from the heat or energy feed acting on the second side for the soldering (Note the hot air or the heat feed 101 as in figure 6, acts on the second side of the PCB 32 on which the heat resistance component 37 is placed). Shibo et al. also teaches a circuit board arranged horizontally during travel through the reflow oven by a conveyor (81, figures 1A and 5, and column 2, lines 43-60) for the soldering; wherein THT-components are located on a side of the circuit board opposite that of the heat resistant components (Note, the limitation calling for THT-component to be located underneath the circuit board is noted, however one of ordinary skill in the art reading the claims in light of the applicant's disclosure, would appreciate that said limitation "underneath" can be interpreted to mean, that side of the circuit board opposite the direction of the heat feed). Shibo et al. teaches THT component(s) of low heat resistant located at a side of the circuit board opposite the direction of the heat feed or the hot side (101) thereby enabling said components to be thermally shielded or separated from

Art Unit: 1793

the direct heat by the circuit board itself (also see, column 4, lines 33-40 and figure 6).

(It should be pointed out that though in figure 6, cool air (102) is used for cooling and regulating the temperature on the side of the non-heat resistant components, regardless said components are thermally separated by the circuit board itself and therefore the circuit board of Shibo et al. inherently meet the shielding limitation (see, column 3, line 62-column 4, line 50).

Shibo et al. fails to teach the specific minimum temperature difference between the first side and the second side as set forth in this claim. However Shibo et al. teaches directing hot air at a temperature of about 420-450 degrees Celsius to the first side (hot side having the heat resistant components) and directing cold air at about 90 degrees Celsius to regulate the temperature of the second side (cold side, having the non-heat resistant component) therefore by invoking on basic concept of heat transfer and heat balance one of ordinary skill would appreciate that the heat differential between the first side and the second side would at least exceed 28 degrees Celsius.

Regarding claim 34, Shibo et al. teaches comprising the step of: applying solder paste to solder contact (see, column 4, lines 33-40 and column 5, lines 11-25) surfaces provided on the second side of the circuit board for a populating of the second side of the circuit board with at least one SMD-component, wherein: following populating of the second side of the circuit board with the SMD-component, it is soldered, together with the connection wire of the THT-component, in the reflow oven (Note Shibo et al. teaches a one step process by which both the heat resistance and the non-heat

Art Unit: 1793

resistant components are soldered in one pass reflow, column 5, line 53 – column 6, line 10 and column 7, lines 34-61).

Regarding claim 36, Shibo et al. teaches having at least one SMD-component populated at the first side of the circuit board (see, the heat resistant surface mount component (SMD) 37, figure 6).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 37, and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibo et al. (US Patent No. 6123247) as applied to claim 65 above and further in view of Wentworth (US Patent No. 5373984).

Regarding claim 37, Shibo et al. teaches a single pass solder reflow process of mixed technology wiring boards containing both surface mount components (SMD) of high heat resistance and plated through-hole components (THT) of low heat resistance, but fails to teach the two pass reflow process as set forth in claim 37.

Wentworth teaches a two pass solder reflow process of mixed technology wiring boards containing both surface mount components (SMD) and plated through-hole components (THT), (see Wentworth, abstract); wherein a conductive adhesive (note the conductive adhesive includes solder paste, (see, column 6, lines 34-38)) is applied

Art Unit: 1793

to a first side of the circuit board and populated with SMD; applying conductive adhesive to a location of said first side and populating with plated through-hole components (THT), soldering by reflowing to adhere the plurality of surface mount components on the first side of the circuit board (see Wentworth , column 2, lines 44-58), continuing a second pass by applying conductive adhesive to a second side of the circuit board and populated with SMD; applying adhesive to a location of said second side and populating with plated through-hole components (THT), soldering by reflowing to adhere the plurality of surface mount components on said second side of the circuit board (see, Wentworth, column 2, line 58-column 3, line 14). Reading Wentworth, one would appreciate that surface mount components and plated through-hole components of the same thermal or heat tolerance can be mixed populated on common side of a double sided circuit board and reflow at the same time.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of, Shibo et al. to use a sequential or two pass reflow process as taught by Wentworth which would have meant substituting one known reflow alternative for another which allows mixed surface mount components and plated through-hole components of the same thermal or heat tolerance to be mixed populated on the same side of a double sided circuit board and reflow at the same time (see Wentworth , column 2, line 44- column 3, line 14).

Regarding claim 41, Shibo et al. is silent on adhesive, however, Wentworth recite conductive adhesive for securing both the SMD and the THT-component; wherein said conductive adhesive encompasses solder paste (see, column 6, lines 34-38). The

Art Unit: 1793

selection of an appropriate conductive adhesive to secure THT-component would have been within purview of one of ordinary skill in the art since said adhesive is not limited to solder.

Regarding claim 42 and 43, both Shibo et al. and Wentworth teach securing the THT-component in the through-hole of the circuit board, but are silent on the mechanical snap-in mechanism as set forth in claims 42 and 43. However said mechanical snap-in mechanism is known as convention in the art for securing THT-component onto a circuit board (Furthermore support for said assertion can also be found in the applicant's specification, last paragraph of page 11). Selection of said mechanical snap-in mechanism to secure the THT-component onto the circuit board would have been within purview of one of ordinary skill in the art.

10. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shibo et al. (US Patent No. 6123247) as applied to claim 65 above and further in view of Wentworth (US Patent No. 5373984).

Regarding claim 44, Shibo et al. teaches a single pass solder reflow process of mixed technology wiring boards containing both surface mount components (SMD) and plated through-hole components (THT), but fails to teach the two pass reflow process as set forth in claim 44.

Wentworth teaches a two pass solder reflow process of mixed technology wiring boards containing both surface mount components (SMD) and plated through-hole components (THT), (see Wentworth, abstract); wherein a conductive adhesive (note

Art Unit: 1793

the conductive adhesive includes solder paste, (see, column 6, lines 34-38)) is applied to a first side of the circuit board and populated with SMD; applying conductive adhesive to a location of said first side and populating with plated through-hole components (THT), soldering by reflowing to adhere the plurality of surface mount components on the first side of the circuit board (see Wentworth , column 2, lines 44-58), continuing a second pass by applying conductive adhesive to a second side of the circuit board and populated with SMD; applying adhesive to a location of said second side and populating with plated through-hole components (THT), soldering by reflowing to adhere the plurality of surface mount components on said second side of the circuit board (see, Wentworth, column 2, line 58-column 3, line 14). Reading Wentworth, one would appreciate that surface mount components and plated through-hole components of the same thermal or heat tolerance can be mixed populated on common side of a double sided circuit board and reflow at the same time.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the process of, Shibo et al. to use a sequential or two pass reflow process as taught by Wentworth which would have meant substituting one known reflow alternative for another which allows mixed surface mount components and plated through-hole components of the same thermal or heat tolerance to be mixed populated on the same side of a double sided circuit board and reflow at the same time (see Wentworth , column 2, line 44- column 3, line 14).

Response to Arguments

11. Applicant's arguments with respect to claims 33-37, 41-44, 49, 65 and 66 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL ABOAGYE whose telephone number is (571)272-8165. The examiner can normally be reached on Mon - Fri 8:30am - 5pm.

Art Unit: 1793

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. A./
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793